

MARSHALL STAR

Serving the Marshall Space Flight Center Community

May 12, 2011

Bringing Marshall back to work



As Alabama picks up the pieces from the April 27 tornadoes that devastated several counties, Marshall Space Flight Center team members were busy cleaning the center and restoring power to the infrastructure before the center was safe to open. Above, Marshall Protective Services security officer Albert Newsome and utility crews work to restore power and ensure that there was no residual damage. Team members were welcomed back May 9. See page 5 for more photos of employees working around the clock to bring Marshall back to work.

Message from the administrator

The severe weather that devastated parts of the country has hit close to home for the NASA family.

Madison County, home to Huntsville and the Marshall Space Flight Center, was in the path of the storm. Many of our co-workers and friends are dealing with property damage and power outages and Robert Lightfoot and his leadership team at Marshall continue their efforts to account for all our NASA and contractor employees.



Charles Bolden

Although the damage in Alabama to homes and businesses is unimaginable, we can at least take solace in the fact that property can be replaced. Lives, however, cannot and the toll in human life is even more tragic. Our thoughts and prayers are with all those who lost loved ones or friends.

We often talk about "the NASA family." These are not just words. Everyone at NASA, regardless of their geographic location, pulls together to support each other in times like this. The employees and contractors at Marshall Space Flight Center proved this in 2005 when they opened their hearts, homes, and wallets to many of our Stennis and MAF families who found themselves homeless for a time.

Local storms, power outage didn't stop Marshall from supporting planned shuttle launch

By Sanda Martel

Generators automatically started up to provide electricity at the Huntsville Operations Support Center in Building 4663 when tornadoes hit northern Alabama April 27.

The shuttle team arrived early on launch day, April 29, to provide support for space shuttle Endeavour's launch at Kennedy Space Center, Fla. – just as it does for each shuttle launch.

Managers knew the HOSC was capable of providing flawless launch support

See *Shuttle* on page 7

See *Bolden* on page 2

Director's Corner

Take care of yourselves and your neighbors

Welcome back to work. None of us will forget the past two weeks when we saw possibly the most destructive single day of weather in Alabama's history.

Hundreds of thousands of people lost electricity for days. At last count, tornados destroyed the homes of 45 of our colleagues and damaged 48 others. Though no Marshall employees were killed or seriously injured, some lost family or friends to storm-related injuries. It's a credit to all our volunteers that everyone who asked for help has received it.

The coming weeks and months will be a trying time for those employees, and I'd ask you to keep them in your thoughts and prayers. Take care of yourselves and your neighbors. Events like this remind us of what's most important.

Marshall fortunately sustained only minor damage, but it took an extraordinary effort by many to make sure we could continue to support our critical role in the nation's civilian space program until we could re-open for full operations.

We were fully ready to support the STS-134 launch before it was rescheduled. We continued International Space

Station operations at our Payload Operations Integration Center. We also completed a critical test of the James Webb Space Telescope flight mirrors at our X-ray and Cryogenic Facility.

I don't want to leave out the teams from our Facilities, Information Technology, Procurement, Financial, Strategic Analysis and Communications, and Human Capital offices. They kept us supplied with fuel and food, kept information systems running, kept communications open, kept paying people, and provided support to our families who were hardest hit and needed help the most.

Our support contractors performed incredibly under tough conditions. The NASA Exchange, which always seems to be there when we celebrate, was also there to help provide food for mission-essential workers.

We couldn't have asked for better support than we got from our U.S. Army Redstone Arsenal partners, who provided, food, fuel, hot showers, and coordinated closely on getting power back up.

I hope this issue of The Star and the all-hands meeting Monday give you a better understanding of what

happened here for the past couple of weeks. I also hope it gives you some insight into who we are here. You don't have to wait for an astronaut visit to meet heroes. Look around you. There are heroes in our halls every day, even if they don't ride to work in a space shuttle. I'm extremely proud of how the Marshall Team once again came together to overcome a difficult challenge.

Our challenge now is to maintain focus. We have a shuttle mission scheduled now for May 16. We have a space station 230 miles in orbit. We have the Space Launch System efforts spinning up, strong science and technology work continuing, and, as we saw this past week, a center that must continue to operate efficiently and effectively.

Thanks again for the amazing work you do – on the bad days as well as the good days.



A handwritten signature in dark ink, appearing to read "Robt. Lightfoot".

Robert Lightfoot
Marshall Center Director

Bolden *Continued from page 1*

They joined with the NASA family around the country in sending relief items and supplies and also shared office space with many who worked from MSFC as the region slowly returned to normal. To the members of the NASA family in Alabama, we are standing with you now just as you did with your fellow NASA family

members then.

I encourage everyone to visit <http://www.fema.gov/rebuild/recover/howtohelp.shtm> to see how you can offer support to the people in Alabama and other states across the country impacted by these storms. I also encourage every member of the NASA family to visit <http://www.ready.gov>

for more information on how to prepare in case disaster strikes where you live.

Again, please keep the members of the NASA family impacted by these storms in your thoughts and prayers. Together, we will get through this tragedy.

-Charlie B.

Teamwork gets Payload Operations Center through storm

By Lori Meggs

While most folks were at home cleaning up from the April 27 tornado outbreak and roughing it without power, NASA's Payload Operations Center cadre at the Marshall Space Flight Center was at work – business “almost” as usual – planning and coordinating science for the International Space Station. Although it was normal operations for the team, there were some acts of kindness and true teamwork within the payload “family.”

“The day following the storms and the power outages, we called all the people scheduled to work in the next five days to make sure they were safe, and had enough gas to come to work – this was the start of making sure all of our folks were accounted for,” said Pat Patterson, payload operations manager for Expedition 27 at Marshall.

One call led to a selfless act by one of the cadre. Data Management Coordinator Cat Gibson is a caregiver for her mother, whose medical equipment requires electricity. When her lead, Tim Hanby, contacted her to make sure she was safe and able to work, he found out she was desperately trying to find a way to power her mother's medical equipment. Hanby passed the information on, looking for others who could work her shifts. That's when one of her colleagues, Mark Roberts, stepped up and brought her a generator and gas. Gibson now calls Roberts her “personal hero.”

“Mom was losing her color by the end of the first day without power, the hospitals were jam-packed and we were at the bottom of the waiting list to get in,” said Gibson. “Mark delivered the generator and gas, and the following morning Mom's color came back to normal and she was doing much better. I honestly believe Mark saved her life that day!”

Before Marshall's Office of Center Operations arranged for mission-essential team members to get gas on center, Roberts, who lives in Florence, also brought in two full five-gallon cans of gas and candles for fellow team members. Other cadre members, Robbie Hawkins and John Calvert, brought in a few more cans of gas. They left the cans at the front door of the Payload Operations Center in Building 4663 for folks who were running low.

“These are just a few examples of our extraordinary team and how we are one big family,” said Lybrea Woodard, manager of Marshall's Payload Operations. “Our team really pulled together in order to accomplish all of the science

activities that NASA and the crew aboard the station depend on us for.”

Because the building had generators, the Payload Operations Center lost power for only minutes at a time. However, when Redstone Arsenal – which supplies power to Marshall Center buildings – tried to go to commercial power the day after the storms, all of Huntsville Operations Support Center facility systems shut down, causing the payload cadre to be without services – such as command and telemetry to and from the space station – for about eight hours. A few science activities had to be re-planned and Mission Control Center in Houston had to monitor voice communications for about an hour, but that was the only real hiccup, Patterson added.

In addition, when space shuttle Endeavour's scheduled launch was scrubbed April 29 due to an issue in a heater circuit associated with Endeavour's hydraulic system, the team replanned the week's science activities for the crew aboard the station, accomplishing nearly 40 hours of NASA science.

“We are so thankful to Marshall's Center Operations for making fuel available to our team so they could get to their shifts, and to Redstone Arsenal for allowing team members access to the Army Fitness Center for hot showers,” added Woodard.

And not only did the Payload Operations Center cadre demonstrate great teamwork, said Patterson, but the entire International Space Station community offered words of support and encouragement, from the lead flight director at Johnson Space Center in Houston to international partners in Japan and Europe to the crew living and working in space.

Meggs, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.



Members of the Payload Operations Center team meet on April 28 to outline a strategy to support all of their 24/7 shifts. They also needed to ensure all flight controllers were safe, suffered no serious damage and had gas to come in to support science activities aboard the International Space Station.

To protect and serve: Marshall officer shows true meaning of service

By Jennifer Stanfield

Marshall Space Flight Center Protective Services security police officer Michael Martin was one of the first responders to the Anderson Hills neighborhood, one of the areas hit hard by tornadoes that ripped through North Alabama.

Martin had spent much of his day on Wednesday, April 27, ushering Marshall employees into protective areas as the first wave of severe weather and tornado warnings emerged. Following his 6 a.m.-2 p.m. shift at Marshall, he left work, picked up his three kids, and headed home to prepare his family for the next wave of storms.

Monitoring a police scanner at home that evening, Martin learned about the devastation in Anderson Hills, just two miles from his home on the Hazel Green/Toney line. Martin made sure his family was safe, grabbed his badge, donned a police T-shirt and headed out to provide assistance.

"My wife knew I had to go," said Martin. "She saw it in my eyes and said, 'I know what you have to do.' I knew they needed assistance and I also knew the only people who would be allowed in the area immediately were law enforcement."

Martin's wife, Victoria, is no stranger to emergency response. She and Michael met at Marshall where Victoria also works as a security police officer for Marshall Protective Services.

Arriving at Anderson Hills, Martin helped triage injured and disoriented tornado victims, directing them to medical teams who were just arriving on the scene.

"I've never seen devastation like that," Martin noted, and he has first-hand experience with tornado damage. The same tornado that destroyed Anderson Hills in 1995 also leveled his home in New Market, Ala.

Since April 27, Martin has reported to duty at Marshall each day and



Marshall Center Protective Services security police officer Michael Martin

each night has reported to different communities impacted by the storm to help out. He's sifted through debris, directed traffic, patrolled neighborhoods and reassured victims that property can be replaced.

Marshall Protective Services Sgt. Jerry Simmons, one of Martin's superiors, was not surprised by his altruism.

"Mike's professionalism on the force is remarkable, he is always the first to volunteer for an assignment," said Simmons. "But what really makes him stand out is his service to the community off-duty."

Martin began his career in law enforcement at age 16 as a cadet with the Madison County Sheriff's Department. At age 21, he signed on as a full-time sheriff's deputy. Now age 29, he's been serving on Marshall's Protective Services force for five years.

He credits his commitment to

public service and work ethic to his grandfather Albert Powell, who served as a faithful volunteer on the Madison County Sheriff's Mounted Posse, deputizing civilians skilled

in horsemanship, rescue operations and emergency response.

Martin says every chance he gets he'll continue to assist with recovery efforts.

"You don't have to be in law enforcement to help out," he said. "You don't have to be trained. All the experience and training in the world doesn't fully prepare you for a disaster."

Anyone can pitch in. Help your neighbor clear brush, cook a

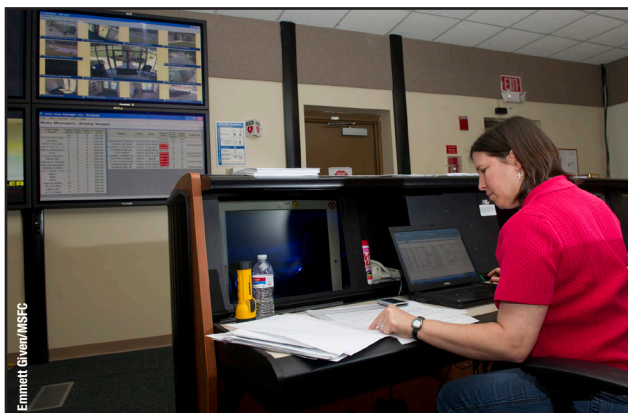
homemade meal or invite someone into your home for a hot shower. The great thing about Huntsville is so many people are out there pitching in."

Stanfield is a public affairs officer in the Office of Strategic Analysis & Communications.

"Mike's professionalism on the force is remarkable. He is always the first to volunteer for an assignment. But what really makes him stand out is his service to the community off-duty."

**— Jerry Simmons
Marshall Protective Services sergeant**

Bringing Marshall back to work



Tia Ferguson, an aerospace engineer in Marshall's Engineering Directorate, is one of many volunteers from across the center who manned the "Marshall helping Marshall" lines, connecting people and resources with other people who needed help after the April 27 tornadoes.



A group of Utility Control System employees service one of the center's mobile generators placed to support an ad hoc mission. Ad hoc is a mission that was not on the normal listing of missions, but one that was for a specific time and purpose.



Skip Pearson, a Utility Control System employee supporting the Office of Center Operations, makes sure that the circuits on the board that is used to track the utility status for the center are operational.

David Jeffreys, manager of the Workforce Strategy & Planning Office in the Office of Human Capital, and Digna Carballosa, deputy director of Human Capital, ensure that team members are accounted for after the storms hit the area.



A lineman works on a utility line while a police officer patrols the center.

NASA's Gravity Probe B confirms two Einstein space-time theories

NASA news release

NASA's Gravity Probe B, or GP-B, mission has confirmed two key predictions derived from Albert Einstein's general theory of relativity, which the spacecraft was designed to test.

The experiment, launched in 2004 and managed by the Marshall Space Flight Center, used four ultra-precise gyroscopes to measure the hypothesized geodetic effect, the warping of space and time around a gravitational body, and frame-dragging, the amount a spinning object pulls space and time with it as it rotates.

GP-B determined both effects with unprecedented precision by pointing at a single star, IM Pegasi, while in a polar orbit around Earth. If gravity did not affect space and time, GP-B's gyroscopes would point in the same direction forever while in orbit. But in confirmation of Einstein's theories, the gyroscopes experienced measurable, minute changes in the direction of their spin, while Earth's gravity pulled at them.

The findings are online in the journal *Physical Review Letters*.

"Imagine the Earth as if it were immersed in honey. As the planet rotates, the honey around it would swirl, and it's the same with space and time," said Francis Everitt, GP-B principal investigator at Stanford University in California. "GP-B confirmed two of the most profound predictions of Einstein's universe, having far-reaching implications across astrophysics research. Likewise, the decades of technological innovation behind the mission will have a lasting legacy on Earth and in space."

GP-B is one of the longest running projects in NASA history, with agency involvement starting in the fall of 1963 with initial funding to develop a relativity gyroscope experiment. Subsequent decades of development led to groundbreaking technologies to control environmental disturbances on spacecraft, such as aerodynamic drag, magnetic fields and thermal variations. The mission's star tracker and gyroscopes were the most precise ever designed and produced.

GP-B completed its data collection operations and was decommissioned in December 2010.

"The mission results will have a long-term impact on the work of theoretical physicists," said Bill Danchi, senior astrophysicist and program scientist at NASA Headquarters in Washington. "Every future challenge to Einstein's theories of general relativity will have to seek more precise measurements than the remarkable work GP-B accomplished."

Innovations enabled by GP-B have been used in GPS technologies that allow airplanes to land unaided. Additional GP-B technologies were applied to NASA's Cosmic Background Explorer mission, which accurately determined the universe's background radiation. That measurement is the underpinning of the big-bang theory, and led to the Nobel Prize for NASA physicist John Mather.

The drag-free satellite concept pioneered by GP-B made a number of Earth-observing satellites possible, including NASA's Gravity Recovery and Climate Experiment and the European Space Agency's Gravity field and steady-state Ocean Circulation Explorer. These satellites provide the most precise measurements of the shape of the Earth, critical for precise navigation on land and sea, and understanding the relationship between ocean circulation and climate patterns.

GP-B also advanced the frontiers of knowledge and provided a practical training ground for 100 doctoral students and 15 master's degree candidates at universities across the United States. More than 350 undergraduates and more than four dozen high school students also worked on the project with leading scientists and aerospace engineers from industry and government. One undergraduate student who worked on GP-B became the first American woman in space, Sally Ride. Another was Eric Cornell who won the Nobel Prize in Physics in 2001.

"GP-B adds to the knowledge base on relativity in important ways and its positive impact will be felt in the careers of students whose educations were enriched by the project," said Ed Weiler, associate administrator for the Science Mission Directorate at Headquarters.

Stanford University, NASA's prime contractor for the mission, conceived the experiment and was responsible for the design and integration of the science instrument, mission operations and data analysis. Lockheed Martin Corp. of Sunnyvale, Calif., designed, integrated and tested the space vehicle and some of its major payload components.

For more information about Gravity Probe B, visit http://www.nasa.gov/mission_pages/gpb/.



Artist concept of Gravity Probe B spacecraft in orbit around the Earth.

running on generators, but the challenge was internal communication among team members about work schedules and travel to and from the center because of the scarcity of gasoline available for purchase.

"The Marshall Center was closed, all of Huntsville and the surrounding area were without electricity or phones, getting gasoline was almost impossible, and except for wireless communications, we had no way of finding out the status of each team member," said Scott Schutzenhofer, an engineer in the Shuttle Engineering Support Center.

"But none of this stopped our team from showing up to work and doing our jobs," said Schutzenhofer. "We were there as we always are when there's a launch at Kennedy – and this time was no exception.

"As for gasoline availability, the center did a really good job of getting everyone into position and making it possible for

us to receive gasoline at the center for our personal vehicles during a time that little or no gasoline was available for purchase outside the gates of Redstone Arsenal.

"And we had wireless communication – iPhone and BlackBerry – that allowed us to exchange data and voice communications, so we really didn't miss a beat."

Space shuttle Endeavour's STS-134 launch was postponed on April 29, at 11:32 a.m. CDT, a few hours prior to its scheduled 2:47 p.m. lift off, because of a heater issue associated with the shuttle's hydraulic power system. But the Marshall shuttle team was in place at the HOSC and ready to support launch had it occurred that day.

During a shuttle launch, approximately 150 Marshall support center personnel monitor the shuttle propulsion elements via a multiplexed satellite system supporting two closed circuit television feeds, one of which

allows Marshall engineers to control camera selections. They also have access to more than 25 direct voice communications lines linked to the launch site at Kennedy, Mission Control at Johnson Space Center in Houston and with shuttle contractor facilities across the country where propulsion system elements are manufactured.

In the Shuttle Engineering Support Center in the HOSC, Marshall engineers staff consoles to monitor real-time data from the space shuttle during pre-mission testing, countdown and launch. The shuttle team evaluates and helps solve technical issues that might occur and determines whether Marshall-developed propulsion systems – the external tank, the reusable solid rocket boosters and the space shuttle main engines – are "go" for launch.

Martel, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis and Communications.

Marshall Star goes online only beginning June 2; Daily Planet to cease publication

Due to budget constraints, the Marshall Star will only be available online beginning June 2. The last printed issue will be May 26.

To continue reading the Star, simply visit <http://marshallstar.msfc.nasa.gov/>. A link will be sent to the Marshall Space Flight Center workforce every Wednesday

when the new issue is posted. Articles also will be available on ExplorNet, the center's new internal social media tool created to increase collaboration, communicate in real-time throughout the Marshall community and find expertise.

The Star will no longer be mailed to Marshall retirees or to other NASA centers. Classified advertisements also will cease in the Star. However, Marshall team members can post their ads on ExplorNet.

In addition, the Daily Planet will not be available after May 31. To view the latest NASA news, visit www.nasa.gov.

Classified Ads

To submit a classified ad to the Marshall Star, go to Inside Marshall, to "Employee Resources," and click on "Marshall Star Ad Form." Ads are limited to 15 words, including contact numbers. No sales pitches. Deadline for the next issue, May 19, is 4:30 p.m. Thursday, May 12.

Miscellaneous

Scuba BCD, \$100 obo. 256-653-1127

Solid oak pedestal table, six chairs, \$450. 256-683-8823

Graco Contempo high chair, Birkshire print, \$45; Graco Baby Einstein Stationary Entertainer, \$40. 256-895-2959

Vehicles

Mid-1980s pop-up camper, AC/DC/propane fridge, shower,

sleeps six-eight, \$1,700. 256-723-8877

1995 300ZX 2+2, white, tan leather, auto, 68,450 miles, \$8450. 256-837-2035

1992 Landcruiser FJ80, lift, 33's, ARB, winch, CD, DVD, 200k miles, \$6,950. 256-658-8241

Wanted

Tanning bed, good condition. 16 or more bulbs at reasonable price. 256-479-9182

NASA satellite observes damage path of April tornadoes in Alabama

Recent images of the April 27 storm damage path have been captured by NASA's Terra satellite, part of NASA's Earth Observing Satellite system. An instrument aboard Terra, called Advanced Spaceborne Thermal Emission and Reflection Radiometer, or ASTER, show the scars from the outbreak.

To view the images, visit http://www.nasa.gov/topics/earth/features/tuscaloosa_tornado.html. The images are from an observation that occurred May 4 at 11:45 a.m. CDT near Tuscaloosa, Ala.

The physical principle guiding the use of satellite data to detect tornado damage is based on the premise that the

strong winds associated with a tornado will change the physical characteristics of the surface in such a way as to alter the visible and infrared energy reflected. These characteristics could be a change in the orientation of surface features, such as the complete destruction of a house in a residential area, the snapping of trees in a forest region, the uprooting of crops in an agriculture area, or minimal damage to grassland in a pasture or field.

Images from NASA satellites will aid in damage assessment, determining the tornado width and path length. Further scientific analysis using satellite imagery is planned.

The NASA image was created by the Short-term Prediction and Research Transition project at the Marshall Space Flight Center, using data provided courtesy of the Goddard Space Flight Center in Greenbelt, Md., the Land Processes Distributed Active Archive Center, Japan's Earth Remote Sensing Data Analysis Center, the Ministry of Economy, Trade and Industry, along with the Japan Research Observation System Organization.

Shuttle Endeavour set to launch May 16



NASA managers have set May 16, at 7:56 a.m. CDT, for the lift off of space shuttle Endeavour on the 16-day STS-134 mission to the International Space Station. STS-134 Commander Mark Kelly and his five crewmates will deliver the Alpha Magnetic Spectrometer and connect it to the outside of the space station. The observatory will measure invisible cosmic rays as they traverse the universe. Shuttle Endeavour's first launch attempt was postponed April 29 after a short in the heater circuit associated with the orbiter's hydraulic system. Technicians have determined the most likely failure was inside a switchbox in the shuttle's aft compartment and associated electrical wiring connecting the switchbox to the heaters. The heater circuits prevent freezing of the fuel lines providing hydraulic power to steer the vehicle during ascent and entry.

MARSHALL STAR

Vol. 51/No. 33

Marshall Space Flight Center, Alabama 35812
256-544-0030
<http://www.nasa.gov/centers/marshall>

The Marshall Star is published every Thursday by the Public and Employee Communications Office at the George C. Marshall Space Flight Center, National Aeronautics and Space Administration. Classified ads must be submitted no later than 4:30 p.m. Thursday to the Marshall Public and Employee Communications Office (CS20), Bldg. 4200, Room 102. Submissions should be written legibly and include the originator's name. Send e-mail submissions to: MSFC-INTERCOM@mail.nasa.gov. The Star does not publish commercial advertising of any kind.

Manager of Public and Employee Communications: Dom Amatore
Editor: Jessica Wallace Eagan

U.S. Government Printing Office 2011-723-031-00097

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